

REMARKS

Claims 1, 2, 4 – 10, 12, 13, 16 – 22 and 24 – 27 are now pending in the application. The Examiner is respectfully requested to reconsider and withdraw the rejections in view of the amendments and remarks contained herein.

REJECTION UNDER 35 U.S.C. § 102

Claims 1, 5 – 7, 9, 10, 12, 13, 17 – 19, 21, 22 and 24 – 27 stand rejected under 35 U.S.C. § 102(b) as being anticipated by Tate Jr. et al. (U.S. Pat. No. 6,441,586). This rejection is respectfully traversed.

At the outset, Applicants note that claims 1, 13 and 26 have been amended to include modeling the EC with a state prediction model and a parameter prediction model and processing the state prediction model and the parameter prediction model through a time-varying state and parameter estimator to determine states and parameters of the EC, wherein the parameters include charge and discharge variables. Tate Jr. fails to teach or suggest modeling the EC with a state prediction model and a parameter prediction model and processing the state prediction model and the parameter prediction model through a time-varying state and parameter estimator to determine states and parameters of the EC, wherein the parameters include charge and discharge variables.

The method of the present invention enables estimation of the state and parameters of an EC based on terminal voltage and current, while the EC is used during normal operation, by processing state and parameter prediction models to determine states and parameters of the EC. In this manner, the present invention not only enables

a state (e.g., SOC) to be determined, but also enables parameters including the charge and discharge variables to be determined, which provide an indication of the state of health (SOH) of the SOC.

Tate Jr. discloses an SOC method and apparatus for a battery. More specifically, a state prediction model is processed through a time-varying state estimator (e.g., a Kalman filter) to determine the SOC. Tate Jr. does not disclose either a parameter prediction model or determining parameters including charge and discharge variables. Accordingly, the method and apparatus of Tate Jr. can not determine the SOH of the battery.

In view of the foregoing, claims 1, 13 and 26 define over the prior art, and reconsideration and withdrawal of the rejections are respectfully requested.

With regard to claims 5 – 7, 9, 10, 12, 17 – 19, 21, 22, 24, 25 and 27, Applicants note that each ultimately depends from one of claims 1, 13 and 26, which define over the prior art, as discussed in detail above. Therefore, claims 5 – 7, 9, 10, 12, 17 – 19, 21, 22, 24, 25 and 27 also define over the prior art for at least the same reasons with respect to claims 1, 13 and 26, and reconsideration and withdrawal of the rejections are respectfully requested.

REJECTION UNDER 35 U.S.C. § 103

Claims 2 – 4, 8, 11, 14 – 16, 20 and 23 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Tate Jr. et al. (U.S. Pat. No. 6,441,586). This rejection is respectfully traversed.

Claims 3, 11, 15 and 23 have been cancelled without prejudice or disclaimer of the subject-matter contained therein. Accordingly, the rejection of claims 3, 11, 15 and 23 has been rendered moot.

With regard to claims 2, 4, 8, 14, 16 and 20, Applicants note that each ultimately depends from one of claims 1, 13 and 26, which define over the prior art, as discussed in detail above. Therefore, claims 2, 4, 8, 14, 16 and 20 also define over the prior art for at least the same reasons with respect to claims 1, 13 and 26, and reconsideration and withdrawal of the rejections are respectfully requested.

DOUBLE PATENTING REJECTION

Claims 1 – 27 stand rejected on the grounds of a non-statutory obviousness-type double patenting as being unpatentable over claims 1 – 13 of U.S. Patent No. 6,927,554 (hereinafter “the ‘554 patent”).

As discussed in detail above, each of claims 1, 13 and 26 have been amended to include modeling the EC with a state prediction model and a parameter prediction model and processing the state prediction model and the parameter prediction model through a time-varying state and parameter estimator to determine states and parameters of the EC, wherein the parameters include charge and discharge variables.

The disclosure of the ‘554 patent is limited to estimation of the SOC of a battery and does not disclose estimating the state of health (SOH). More specifically, the present invention, as claimed in claims 1, 13 and 26, determines not only a state of an EC (e.g., the SOC), but also determines parameters (e.g., the charge and discharge

variables), which can indicate the SOH of the EC. In this manner, the present invention expands on the disclosure of the '554 patent by enabling the SOH to be determined.

Applicants further note that it would not be obvious to determine such parameters based on the disclosure of the '554 patent. The Examiner has asserted that it would be obvious "to use a charge variable and a discharge variable to get a more accurate estimated range for the linear equation" (Page 4 of the present Office Action). This statement is inaccurate in that the charge variable and the discharge variable do not provide a more accurate estimated range for the linear equation. Instead, the charge and discharge variables provide an indication of the SOH of the EC, as discussed in detail above. As also discussed in detail above, the '554 patent provides no discussion of determining an SOH of an EC, and more particularly fails to discuss parameters that would be indicative of the SOH.

Accordingly, claims 1, 13 and 26, as amended herein, are patentably distinct from the claims of the '554 patent. Therefore, reconsideration and withdrawal of the rejection is respectfully requested.

OTHER CLAIM AMENDMENTS

As discussed above, claims 3, 11, 15 and 23 have been cancelled without prejudice or disclaimer of the subject-matter contained therein, based on amended claims 1 and 13.

Claims 4, 5, 7, 10, 16, 17, 19 and 22 have been amended to conform with amended claims 1, 13 and 27.

CONCLUSION

It is believed that all of the stated grounds of rejection have been properly traversed, accommodated, or rendered moot. Applicant therefore respectfully requests that the Examiner reconsider and withdraw all presently outstanding rejections. It is believed that a full and complete response has been made to the outstanding Office Action, and as such, the present application is in condition for allowance. Thus, prompt and favorable consideration of this amendment is respectfully requested. If the Examiner believes that personal communication will expedite prosecution of this application, the Examiner is invited to telephone the undersigned at (248) 641-1600.

Respectfully submitted,

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By: Michael D. Wiggins
Michael D. Wiggins
Reg. No. 34,754

GENERAL MOTORS CORPORATION
Legal Staff
Mail Code 482-C23-B21
P.O. Box 300
Detroit, MI 48265-3000